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SOME NUT BEARERS.

By R. W. Curtis.

IN our northern woods there are nine or ten kinds of trees and two kinds of shrubs which are nut bearers. We know their fruits as hickory nuts, butternuts, walnuts, beechnuts, chestnuts and hazelnuts, of which the commercial filberts are cultivated species. We may know these nuts simply as the things which lend flavor to the housewife's skill or add enjoyment to a winter's evening. But he who has hunted nuts in the woods has seen much more. He knows how the nuts grow and where the trees are that bear them. They are his woodland friends and he hails with delight the falling leaves and the late October frosts for now the chestnut burrs are opening and the harvest has begun.

As Thoreau collected his own wood and read the history of each stick and remembered his adventures in getting it while it was burning in the winter evening, so when we bring forth the nuts gathered by our own hands, the spirit of the woods from whence they came gathers with them around the winter fireside. And now as the leaves fall and the fields take on the gray and brown tints of winter, let us renew our acquaintance with the nut bearers. The woods are not dead because the leaves have fallen. The trees stand out bold and free with masks thrown aside, as it were, and faces bare. These winter friends have strong characters. If we look at them now we will find new points of interest.

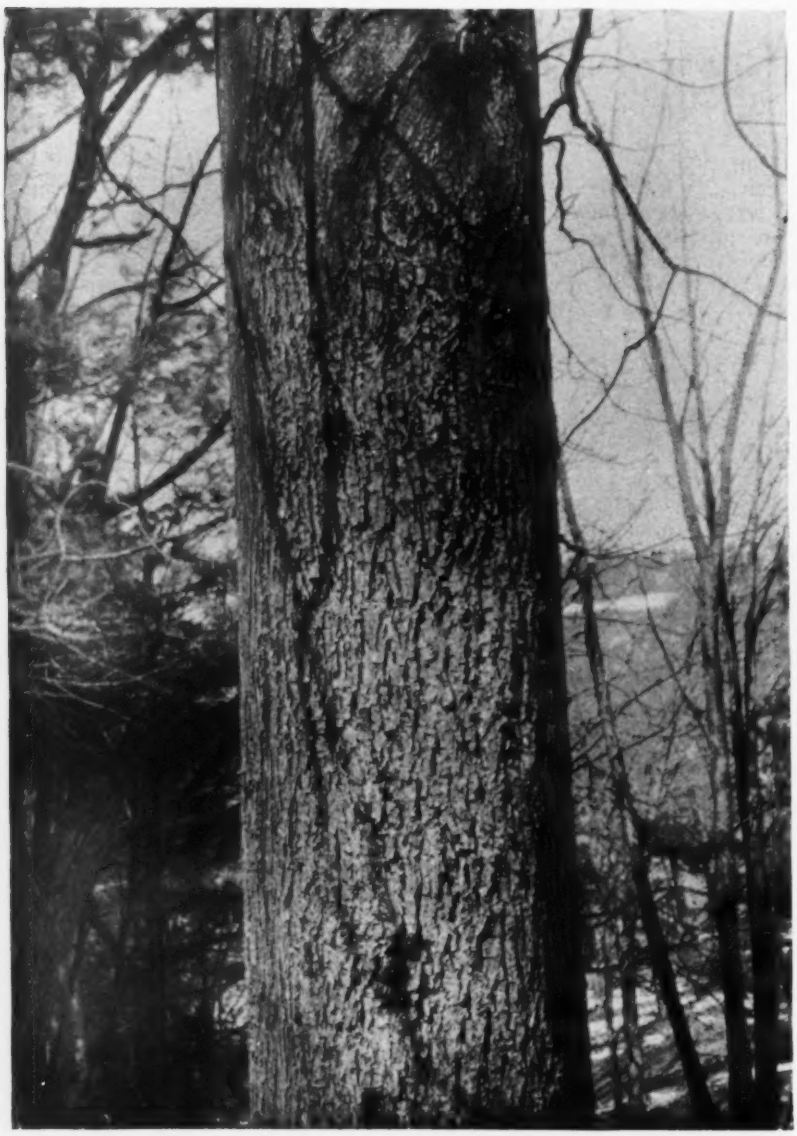
Of all the nut bearers, the Chestnut (Fig. 1) is the strongest, most characteristic type. Longfellow was correct in his observation when he wrote "Under the spreading Chestnut tree." A Chestnut's branches are large and heavy and spread at wide angles with the main stem. The bark of the trunk is also marked with long longitudinal furrows which are distinctive and which the eye soon learns to recognize. Just as we tell at a glance a group of White Pines by their branches silhouetted in layers against the distant sky, so we soon come to know a Chestnut tree in winter by its wide spreading limbs and long, longitudinally furrowed bark.

The Walnuts and Butternuts also have bark characters which are constant and distinctive. Butternut bark is grayish and shallow with elongated diamond-shaped fissures, while that of the Walnuts is peculiarly black and heavy with deep irregular cracks. The twigs of both are stout and coarse with diaphragmed pith and large velvety buds. The pith diaphragms or cross partitions, are grayish or light colored in the Walnuts and dark brown or almost black in the Butternuts. The external bud characters are also good. A Butternut bud is elongated and yellowish brown with a velvety fringe of hairs across the top of the leaf-scar. The Walnut bud is shorter and stouter and grayish or almost pink and without the fringe above the leaf-scar. By such small but constant winter characters we easily recognize these nut bearers and readily distinguish between the two.

Botanically, the Hickories are close relatives of the Walnuts and Butternuts. The three together make up the Walnut family. They all have compound leaves, but differ fundamentally in fruit characters. In the Walnuts and Butternuts the fruit is enclosed in a husk which never splits open, while in the Hickories this husk does split open and allows the nut to drop out. There are a dozen or more

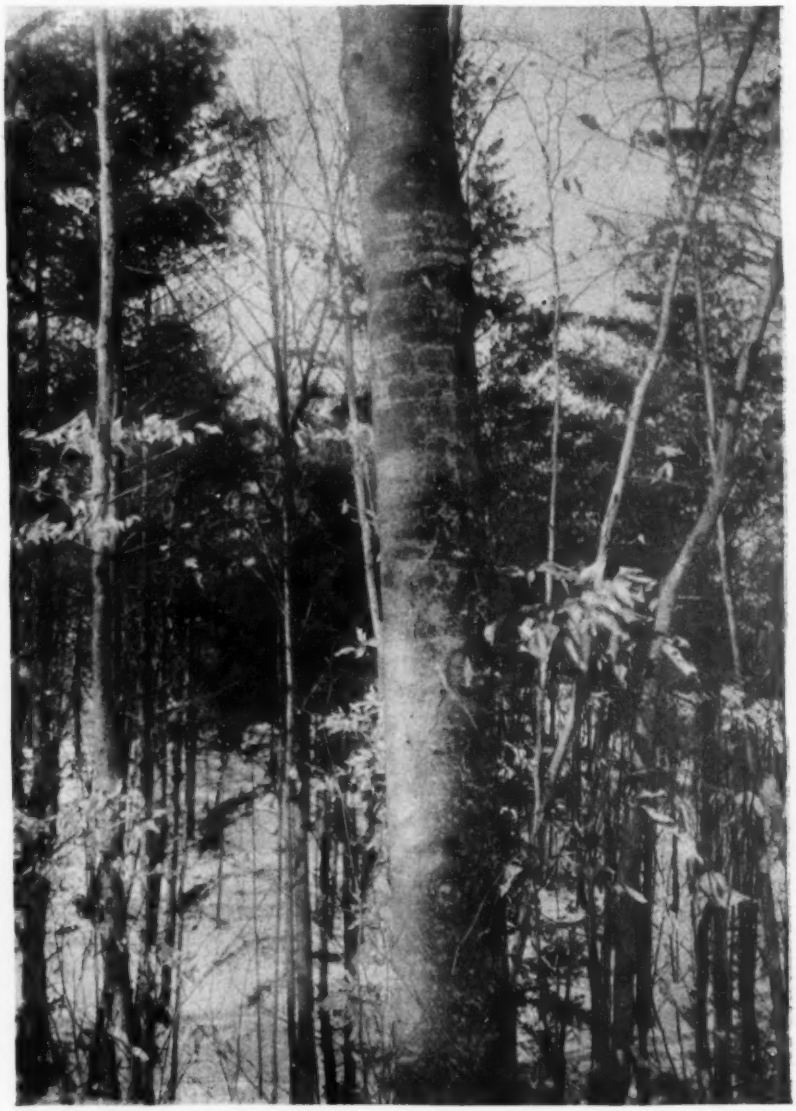
different kinds of Hickories and they are all distinctly American trees. One, the Pecan, is abundant in the southern states where it is extensively cultivated and four others are common in the northeastern United States.

These northern Hickories may be distinguished roughly by the following winter characters: If the buds are yellow and the tree graceful and spreading and the nuts small with thin husk and shell and intensely bitter kernel, it is a Bitter-nut. If the buds are brown and shaggy, i.e., the lower



PIG-NUT BARK

outer bud scales are dry and spreading (see illustration) and the tree has crooked and tortuous branches bearing large nuts with thick husk and sweet kernel and the bark of the trunk splits off in long, broad strips, it is a Shag-bark Hickory. This is the common edible species and is probably the best known of all the Hickories. If the buds are brown and smooth, one bud scale rolled inside another, and the bark of the trunk is furrowed but not distinctly shaggy, it is probably one of two things. Either it is a Mocker-nut, in which case the buds and fruit are large with



BEECH BARK

thick husk like the Shag-bark and the reddish brown nut has a thick shell with small sweet kernel. Or it is a Pig-nut with small buds and fruit, thin husk and shell and slightly bitter kernel. Like the Shag-bark Hickory, the Pig-nut is a common species and often it is very confusing because of its intermediate forms. As a group these northern Hickories all have strong, tough wood and with the exception of the Bitter-nut which is more graceful and Elm-like in outline, they all have a peculiar crooked character of branching which stands out strong and black against a winter sky and lends interest and expression to the landscape.

Very different from these nut bearers are the little Hazel-nuts. They are small to medium size shrubs and not very fruitful in the wild. Corylus Maxima, the filbert of commerce, is a larger cultivated species and much more prolific. Every Hazel-nut envelopes its fruit in a leaf-like husk

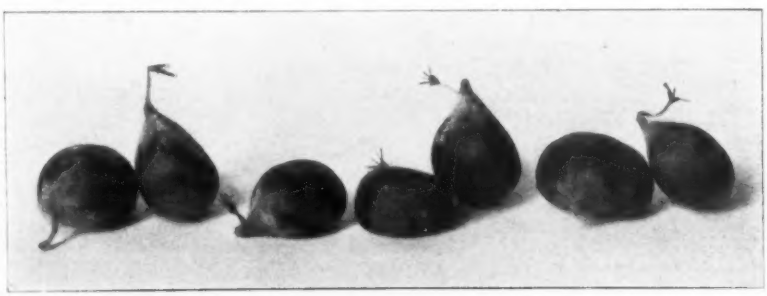
(From Left to Right)—Hazel-nut (Corylus Americana), Butternut (Juglans cineria), Black Walnut (Juglans nigra), American Beech (Fagus Americana), American Chestnut(Castanea Oentata), Bitter-nut (Hicoria minima), Shell-bark Hickory (Hicoria ovata), Hickory (Hicoria), Beaked Hazel-nut (Corylus rostrata).

or involucre. Upon differences in this involucre the different species are mainly based. In Corylus Avellana, a foreign species commonly planted about our lawns, the involucre consists of two distinct bracts which are shorter than the nut. In the wild Hazel-nut (Corylus Americana) common in our woods, these bracts are slightly longer than the nut and in our other native species, the Beaked Hazel-nut (Corylus Rostrata), the bracts are united into a long tube that completely conceals the nut.

Another character which is useful in distinguishing these two nut bearers when their fruits are not present, is the catkins or "tags" which we find on the bushes all winter. These catkins are compact clusters of staminate flowers which open early in Spring before the leaves. The catkins on the wild Hazel-nut are stalked, i.e., on a short stem, while those of the Beaked Hazel-nut are sessile without any stalk or only a very short one. Thus we see again that even small winter characters have their value and may be of real, vital interest.

And last of all we come to the Beeches. Here we find beauty all the year around. In May there are the dainty blossoms, in July the glossy leaves, in October the brown Autumn tints and all winter long the silvery gray trunks and the slender, shining buds, the most graceful of Nature's resting growing-points.

If we look for these things we will find them and the more we want to see the more we will see. It is hoped that this brief introduction to the nut bearers may suggest similar fields elsewhere and help to stimulate more interest in the winter study of plants in general.



THE ALTERNARIA BLIGHT OF GINSENG

By H. H. Whetzel

Assistant Professor of Botany, Cornell University

THE growing of ginseng as a profitable investment of time and money has been severely criticised of late. So general has been this criticism that many people have come to believe that ginseng as a crop is a fake and worthless. Therefore it may not be out of place in presenting the results of some investigations into the diseases of this plant to give some facts and figures in regard to the actual value of this crop in the United States. In the first place practically all the ginseng grown or collected from the woods in this country is exported, nearly all of it going to China where it is used for medicinal purposes. The following figures are taken from the advanced sheets of the Monthly Summary of Commerce and Finance issued by the United States Department of Commerce and Labor. In the advanced sheets for June, 1906, we find under exports of Domestic Merchandise the following item:

TWELVE MONTHS ENDING JUNE

	1904		1905		1906	
Ginseng lbs.	131,882	$851,820	146,576	$1,069,849	160,949	$1,175,844

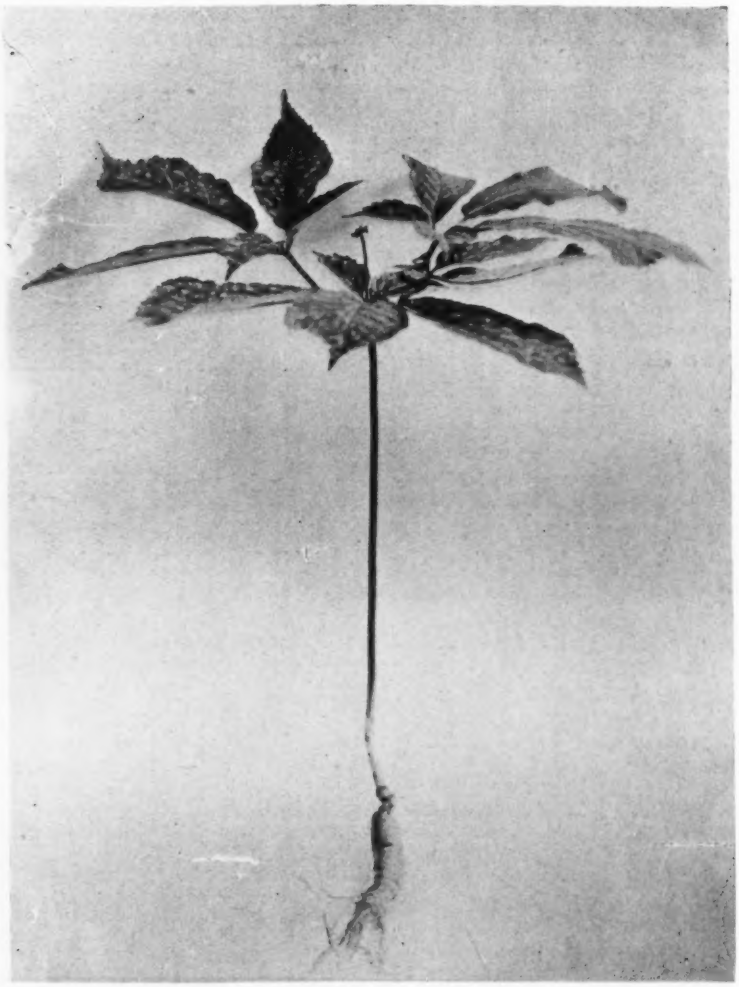


FIG. 1.—HEALTHY 3-YEAR-OLD GINSENG PLANT

From these figures it is clear that the ginseng crop is of considerable proportions and steadily increasing. It is classed with chemicals, drugs, dyes and medicines and is in its class equaled or exceeded in value by only three things; copper sulphate, acetate of lime and patent medicines. These

figures include, of course, both the wild and cultivated root. A little investigation, however, will soon convince any one that the genuine wild root has formed but a small proportion of that exported in the past three years. This for the very good reason that there is practically no wild root to be found. It has been all but exterminated by the "Sang digger," who has carefully searched every wooded hillside and ravine to meet the demand of the last few years for green roots for planting. Practically all of the ginseng exported this season will of necessity be cultivated. According to latest quotations cultivated root of first quality is worth about $6.50. Wild root is somewhat better. Of all the ginseng exported from this country, New York State very probably supplies the greater part. It was in this State that the cultivation of the plant originated and it is here that its culture has become most extensive and perfected. The largest garden in this country, so far as I know, is that of the Consolidated Ginseng Company at Rose Hill this State. Here about ten acres are under shade, all devoted to the growing of ginseng. The crop is certainly a special one, to be successfully grown only by those who can bring to their work an abundance of time and intelligent effort. For those who are willing to run the risks of loss from diseases, and who can afford to wait for returns on their investment, this crop offers relatively large profits.

SUSCEPTIBILITY OF GINSENG TO DISEASE

The pioneer growers of ginseng thought they had struck a "Bonanza." Here was a plant that seemed easily grown, required little attention after it was once planted, was apparently free from all the diseases to which cultivated plants are heir and was, besides, extremely valuable. Their first few crops bore out this supposition. No wonder that a "Ginseng craze" broke out and that men sat up nights to figure out on paper the vast fortunes that were bound to accrue to those who planted a few hundred seeds at three cents each and sold the roots in five years at $12.00 a pound. Like many other grow-wealthy-while-you-wait schemes nature herself imposed a veto. Diseases began to appear. The prospective fortune shrunk, frequently dried up and blew away or rotted and disappeared in the earth. Several factors contributed to this result:

FIG. 2.—Leaflet showing Alternaria blight spots. Early stage in development of the spot.

1. The removal of a wild plant from its natural habitat to an entirely artificial one.

2. The encouragement by the application of manures and cultivation of a rapidity of growth to which the plant was by inheritance an entire stranger, thus weakening its constitution and depriving it of its natural

ability to withstand disease. Cultivated roots in three years from the seed attain greater size than they often would in twenty years in the woods.

3. The failure in many cases to provide conditions in any degree approximating the natural habitat, as for example the failure to supply proper drainage that is in nature provided by the forest trees whose roots constantly remove the excess of rainfall.

FIG. 3.—Photo-micrograph of 2 spores of the Alternaria. (Much magnified.)

4. The crowding of a large number of plants into a small area. This, in itself, is more responsible for disease epidemics than perhaps any other factor.

Of all the twelve or fifteen, now more or less well known, diseases of this plant one in particular stands out as *the disease* of ginseng. Altho one of the latest to make its appearance, it has in three or four years spread to nearly every garden in this State and its ravages have been most severe. This disease is the well known Alternaria Blight.

THE MOST COMMON AND DESTRUCTIVE DISEASE OF GINSENG.

The disease manifests itself in such a variety of ways depending upon the parts of the plant attacked, that it is difficult to give a description by which it may always be identified. It is usually the spotting of the foliage that first attracts the grower's attention. If examined early in the morning the diseased spots are of a darker green color and watery as if scalded. They dry rapidly, becoming papery and of a light brown color, definite in outline and very brittle. (Fig. 1.) With the return of moist conditions at night the disease spreads from

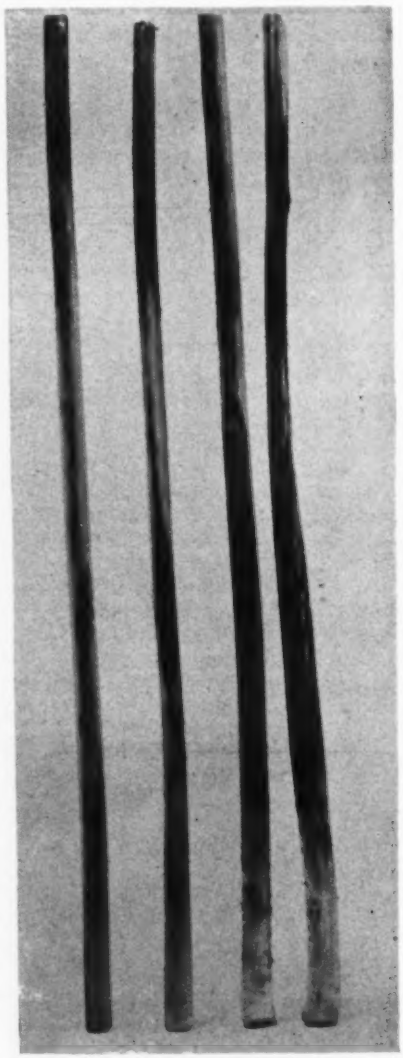


FIG. 4.—"Stem Rot" caused by the Alternaria. The blight starts first on the stems in the Spring.

the margin of the spot into the healthy tissue. The disease progresses rapidly so that in a very few days the entire leaf succumbs, wilts and hangs limp from the stalk. (Fig. 9) If the weather is wet, the progress of the disease is often astonishing, an entire garden going down in a day or two. Under such conditions the leaves may show few or no spots becoming thruout of a dark watery green and drooping as if dasht with scalding water, (Fig. 6). All parts of the top may be affected. The disease never reaches the roots, affecting them only indirectly.

CAUSE OF THE DISEASE.

The disease is the result of the growth of a parasitic fungus in the tissues of the ginseng. This fungus is an Alternaria (species not yet determined) as is at once evident from an examination of its spores. (Fig. 3) These are in size and form much like those of the early Blight Alternaria of Potato. These spores falling upon any part of the plant above ground will if moisture be present germinate very quickly, sending out germ tubes which pierce the epidermis of the host. These mycelium threads ramify thro the tissues of the leaf or stem as the case may be, causing the death of the cells. From the mycelium that lies near or on the surface arise clusters of short brown stalks or conidiophores on the apex of which the spores are borne in short chains. The spores mature quickly and are scattered to healthy plants, resulting in new infections. Only one form of spores, the conidial, is at present known.

That the Alternaria is a true parasite and the cause of the disease there can be no doubt. The fungus is constantly associated with the disease. Inoculation experiments carried on in the botanical laboratory this summer show conclusively that the germ tube of the spore can penetrate the epidermis of healthy ginseng leaves and stems and by its growth in such healthy tissue cause the characteristic spots of the disease. (Fig. 9) This is of special interest as it adds another to the list of the parasitic species of a genus long supposed to contain only saprophytes.

Upon the general appearance of so destructive a disease, one of the first questions of the growers was "Where did it come from?" Believing that it was a natural enemy of the wild plant, now grown overpowerful under conditions highly unnatural to the ginseng, I undertook to find proof of my theory. I visited a wooded hillside where wild ginseng was still known to exist. After half a day's diligent search I obtained seventeen plants of different ages one of which

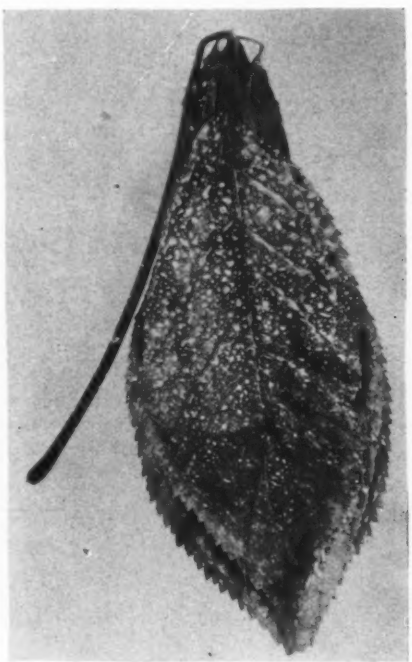


FIG. 5.—Infection of the leaf stalk at the point where leaflets arise often causes them to droop and wilt altho the leaflets may show no blight spots

showed spots of the Blight. Examination with the microscope showed mycelium and spores of the Alternaria. Unfortunately I did not get pure cultures of the fungus from this plant and so could not by cross inoculations demonstrate absolutely the identity of the Alternaria on the wild plant with that on the cultivated. So far, how-

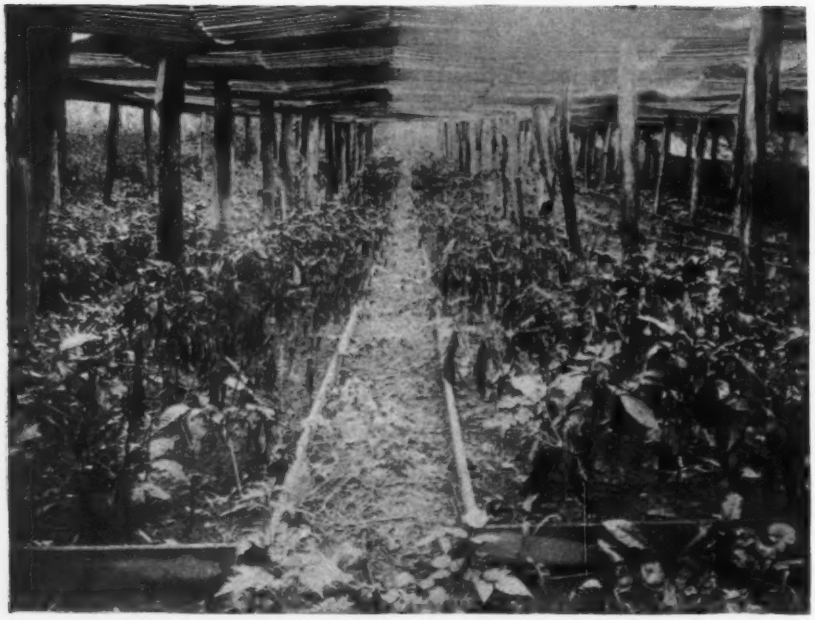


FIG. 6.—Unsprayed garden, Fulton, N. Y., not far from the sprayed garden shown below. Photo'd by the writer Aug. 10, 1905. The unsprayed gardens in Fulton served admirably as checks on Dr. Curtis' work.

FIG. 7.—Sprayed garden of Dr. Curtis', N. Y. Photo'd by the writer Aug. 10, 1906. The tops of the plants in this garden were entirely killed by the blight in 1904.

ever, as character of the spots on the leaves, size and form of spores are concerned, they are the same. This, I believe, answers the question of the source of the disease. Introduced into gardens on wild plants brought from the woods it has spread rapidly under conditions most favorable to its development; namely, those pointed out in the earlier part of this paper.

The wind, I believe, is chiefly responsible for the dissemination of the spores which are very small and light. Not only does the wind carry the spores from plant to plant thruout the garden but no doubt frequently carries them for longer distances to gardens near by. The spores are produced most abundantly under conditions favorable to such dissemination. During moist, cloudy weather the energies of the fungus are devoted to vegetative growth, the spreading of the mycelium in the host tissues. With the advent of bright sunny days and dry weather mycelium growth is checked and spore formation goes on rapidly. These spores are distributed when dry and retain their vitality for a long period. Spores from dried specimens in the laboratory have been found to germinate after several months when placed in water. The disease might also be very readily carried by spores clinging to the roots or seeds, or possibly even by the mycelium in the seeds themselves. The fungus very probably winters in the old leaves and stems or in the mulch, living as a saprophyte and producing early in the spring a crop of spores from which the first infections occur.

SUMMER HISTORY OF THE DISEASE.

Altho it is on the foliage that the disease first attracts the attention of the grower it is not here that it really makes its first appearance in the spring. The stem is the first part of the plant to come thru the soil, and it is the stem that is first affected. The disease begins to show on the stems very shortly after they are thru the soil, evident first as a rusty, yellow spot usually but a short distance above the surface of the soil or mulch. (Fig. 4). The spot rapidly increases in size, becomes brown and finally nearly black from the multitude of spores produced on its surface. The tissue of the stem at the point of attack is killed and shrinks, making a canker or rotten strip up the side of the stem. Such stems show well-developed leaves and blossom heads giving no evidence of the disease beneath. Occasionally, however, the fungus weakens the stem so that it breaks over. Growers have occasionally observed this "stem rot" but have never connected it with the disease on the leaves later in the season.

FIG. 8.—"Seed blast" caused by the Alternaria. Blighted berries shrivel, and shell very easily.

It is from the spores produced on these cankers on the stem that the leaves become infected. The disease begins to appear on the leaves some time in July and by the middle of August there is usually little foliage alive. Infection frequently occurs at the point where the five leaflets are attached to the common petiole. (Fig. 5). The short leaf stems are killed causing the otherwise healthy leaflets to droop and wilt. This manifestation of the disease has not generally been attributed to the Alternaria. The seedlings are frequently affected in the same way causing what is some-

times known as the "top blight of seedlings.'

From the diseased leaves and stems the spores of the fungus find their way to the seed heads which at this time are rapidly filling out by the growth of the berries. The compact seed heads readily retain moisture, furnishing most favorable conditions for the germination of any spores that find their way into the center of the head. That this is the usual course of seed head infection is shown by the fact that it is the base of the berry on which the spots start. These spots, of a rusty yellow color, gradually spread all over the seed which finally becomes shriveled and of a dark brown or black color. Spores in abundance are formed on the diseased berries. Affected berries "shell" from the head at the slightest touch. This manifestation of the disease has long been known as "seed blast." (Fig. 8). If the berries have begun to color the injury from the disease will probably be very slight. The "blasting" of the green berries, however, will undoubtedly reduce or destroy the vitality of the seed. There is a strong probability that the fungus may be carried over in or on the seeds.

The roots are only indirectly affected by this disease. The fungus never penetrates to them. Roots from diseased tops will grow perfectly normal and healthy plants the following season. It is in the leaves of the plant that practically all of the substance of the root is made. The bulk of this substance is starch. The destruction of the foliage, the manufacturing part of the plant, long before it would normally die means of course some reduction in the growth and starch content of the root. However, it seems probable that the greater portion of root growth is made before the blight attacks the foliage. This seems borne out by the fact that even blighted seedlings usually show nearly as good growth and bud development as those not blighted. In the case of older plants this is probably much more true as the latter part of the season is devoted largely to growing and maturing the berries. The Alternaria blight is dreaded chiefly because of its destructive effects on the seed crop.

PREVENTIVE.

The first experimental work on the control of this disease so far as I know, was carried out by Dr. I. C. Curtis, of Fulton, N. Y. Having suffered the total loss of foliage and seed crop during the season of 1904 Dr. Curtis determined to test the efficacy of the Bordeaux mixture the following season as a preventive of the blight. The success of his work, together with his method of making and applying the mixture, is given by him in Special Crops for January, 1906.

Extensive experiments in spraying were carried out during the past season by the Ginseng Company at Rose Hill, N. Y., under the direction of the writer. During 1905 their entire seed crop was completely destroyed by the blight. Losses from the same disease the previous season had been very heavy. During 1905 they had succeeded in saving a very large proportion of their seedlings by spraying with the Bordeaux mixture. Encouraged by this they began spraying early in the spring of 1906, just when the plant began to come thru the ground. This was repeated nearly every week during the season, the entire ten acres being sprayed each time. On account of poor equipment the earlier sprayings were not as thoroly done as they should have been, and some disease appeared on the stalks here and there thruout the gardens. A new pump and nozzles were soon installed and all parts of the plants completely covered . Practically no blight ever appeared on the foliage. There was some loss from "blast of seed heads," due to a failure to spray the seed heads thoroly while they were filling out. The seed heads were doubtless infected from the diseased stalks that had not been removed from the garden. A very large seed crop was harvested. The formula of the Bordeaux used at Rose Hill was about 4-6-40, to each one hundred

gallons of which was added a "sticker" made as follows:

2 lbs. resin;
1 lb. sal soda (crystals);
1 gal. water;

boiled together in an iron kettle until of a clear brown color. It is probable that more applications of Bordeaux were given than was necessary, especially during the middle part of the season when little new growth was being made.

From these experiments it is evident that the problem of the control of the Alternaria Blight of Ginseng has been solved. Thoro spraying with Bordeaux mixture begun when the plants first come thru the ground and repeated often enough to keep all new growths covered, will insure immunity from the blight. Thoroness is the chief factor in the success of this treatment. It is, moreover, useless to begin spraying after the disease has begun to appear on the foliage.

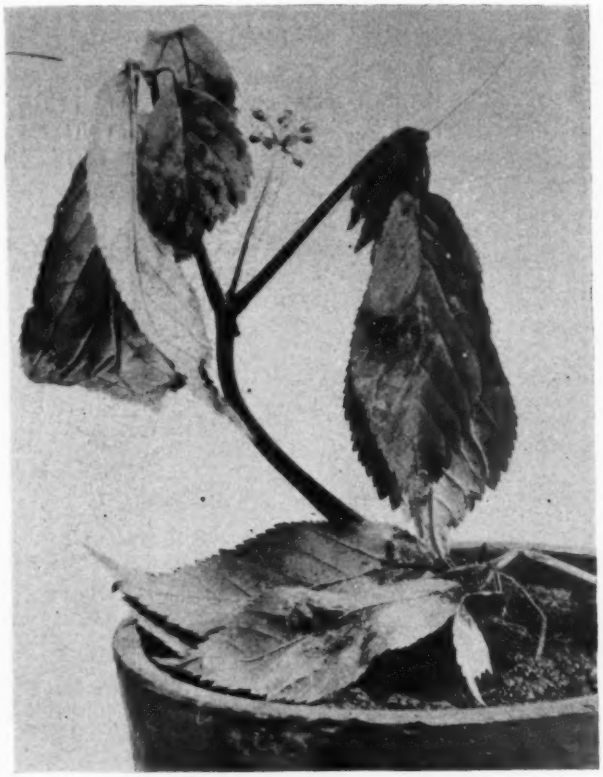


FIG. 9.—Seven days after inoculation with spores of the Alternaria. Note the typical blight spots and drooping leaflets.

Progeny of two ears of corn. They looked alike The good ear occupied 97.3 percent of the ground on which planted and yielded 63 lbs. corn. The poor ear occupied 82.4 percent of its area and yielded 36 lbs. corn.

THE FARMER AND HIS SEED

By F. W. Gilmore

Assistant Professor of Agronomy

THE Ithaca Hotel contains 200 guest chambers more or less. The proprietor has two objects in view, among others, in conducting this hotel. He wants every chamber occupied throughout the season and furthermore he wants the guest a profitable one. These are business propositions. The growing of crops is also a business proposition and embodies the same points of view. Every place in the field for corn should be occupied, not by weeds, but by corn. And it is not enough that corn should grow in each hill, but it should be corn every stalk of which bears acceptable ears.

A few days ago during the county fair a germinating box was on exhibition, and a conversation which took place regarding it embodied some suggestions to a neighbor. He went home, examined his corn field and found fourteen per cent. of his corn hills vacant. He also found seven per cent. of the stalks bearing no ears and furthermore one hundred hills contained only one hundred and seventy-six stalks. Estimating the entire field on the basis of this calculation, and assuming that each hill should bear three stalks this farmer had only 66.4 per cent. of his field occupied by bearing corn.

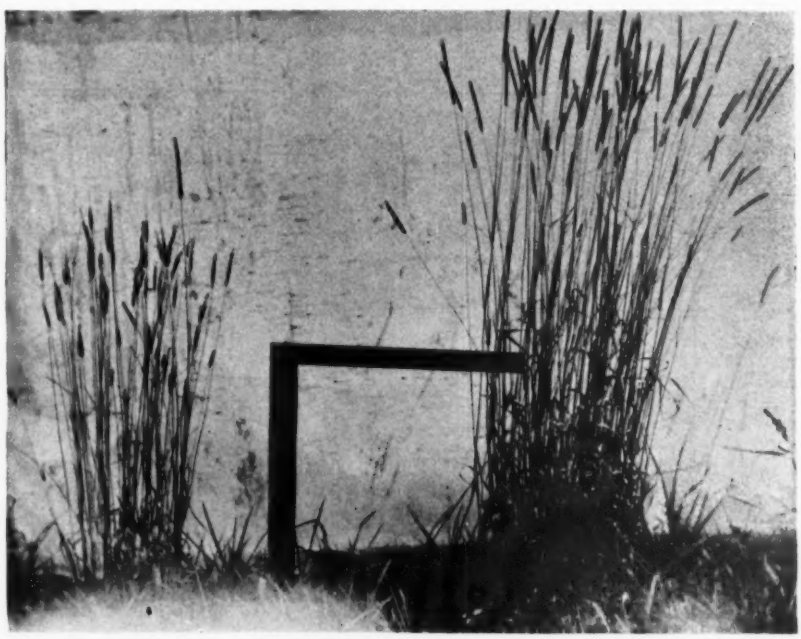
These figures are not exceptional, for this part of the country at least. The farmer should not cultivate nearly two acres of land for a yield of corn which may be produced on one acre. A trial was made this year

upon a small block of corn planted from selected ears. The ears were selected in the field last year from good-looking, vigorous stalks. They were well developed in leafage and size and had the appearance of having grown uniformly. Some of the ears were not altogether ideal in size and shape, some did not have well filled tips and bases, but these points were of secondary importance to the fact that they came of good parents. The selected ears were dried in two crates over a steam radiator in the early part of the winter for two weeks and then stored in a dry room during the remainder of winter. Shortly before planting time each ear was labeled with a number and six grains from each were germinated—two from the tip, two from the middle and two from the base. One hundred and fourteen ears were germinated. All germinated well, but sixteen did not germinate *strong*. These were cast out. In the crop two percent of the hills were vacant, but the stand was about perfect, as one hundred hills produced 297 stalks bearing ears and 8 barren stalks. C. P. Hartley of the Bureau of Plant Industry conducted a trial in which a difference of sixteen bushels per acre was obtained between corn properly dried and stored and which germinated well and strong and that which was ordinarily stored and germinated well.

The same considerations with regard to the importance of good seed may be taken for other farm crops. Clovers and grass seed as found upon the market are especially likely to be of low producing power due to low vitality and presence of foreign matter. An examination of several kinds of seeds revealed the following facts:

	Market price per lb. cents	Lb. good seed per bu.	Cost of good seed per lb. cents
Red clover	7.8	48.66	9.81
Ky. blue grass	10.12	4.12	10.
Timothy	2.4	27.69	28.

These figures, however, do not show the strength of germination in the



Plants from single seeds. The good plant yielded 14 ozs. hay; the poor one only 3. Twenty thousand plants of either might occupy one acre. How much hay would they yield?

samples. This is important. In 1903 about 250 samples of timothy seed were secured from different sources. These were planted in plats separately, a single plant in a place. Many variations have been observed, but one of the most striking is a great difference in vigor between many plants growing side by side and from the same source of seed. There are also many other instances in the field of weakness of growth. Many plants yield maximum amounts of hay, and if the farmer's meadows were made up of such plants as these, his hay crop would be more than fourfold the average for the state. Many other plants are diminutive and of poor leaf. In terms of hay produced they are not worth the ground they occupy, but they are invaluable for study. At first it was a pertinent question whether this difference in vigor between neighboring plants was due to some feature of the soil or exposure-environment, or to hereditary powers. In 1904 seeds were selected from both weak and vigorous plants. These, when planted in rows, showed markedly the vigor characteristic of their ancestors; the vigorous parents produced vigorous progeny and the weak parents produced weak progeny.

Among some 3,000 clover plants which are now growing, there are those of maximum growth and vigor, others are weak and diminutive, scarcely holding their own. In terms of forage they will not be able to pay for their room.

The point I wish to make is that it is not sufficient for seeds to germinate and grow, but they must grow strong and produce something. In spite of all that has been done for the improvement of our domestic animals, there are yet many on our farms which do not pay for their keep. Much attention has been given to conformity, shape, size and the like in both plants and animals, more attention must be given to their performances in production.

FIGURE IX—Gas heated soldering copper (kindness of H. R. Stickney, Portland, Me.)—See next article.

THE MANUFACTURE OF CONDENSED MILK VI

By O. F. Hunziker

FILLING.

THE sweetened condensed milk, thus obtained, is either put up in bulk and sold to candy and caramel factories and bakeries, or it is filled into tin cans, hermetically sealed, labeled, boxed and put on the retail market.

BULK MILK.—In the manufacture of sweetened condensed milk to be sold in bulk, the fresh milk is usually part or wholly skimmed and a smaller percentage of cane sugar is added to it than where sold in tin cans. Instead of using 16 pounds of sugar for every 100 pounds of fresh milk, only about 12 pounds of sugar are taken. This is done in order to reduce the cost of manufacture. While it is condensed at about the same ratio as the whole milk, the finished condensed bulk milk is thinner than that which is not skimmed and which is used for canning, because partly or all-skimmed milk contains a larger percentage of water than whole milk. The margin between the selling price and the cost of bulk milk is usually a narrow one, hence the manufacturer can hardly afford to reduce the bulk milk to the same consistency as the canned goods.

The bulk sweetened condensed milk is put up in barrels (glucose barrels are generally used) holding about 600 pounds of condensed milk. The barrels are filled with the aid of a large tin funnel which is inserted in the bung-hole. When filled, a double layer of cheesecloth is put over the bung-hole and the bung is driven in level with the staves. Before filling the barrel it is well to thoroughly steam it out and, when the condensation water has drained off, the barrel is ready for the condensed milk. Some condensors claim that the steaming of the barrels should be omitted, as the water, soaking into the staves, gives rise to fungus growth. This "theory" has not been borne out in practice, however. The writer's experience in putting up, storing and examining hundreds of barrels of condensed milk was, that the fungus growth was usually more luxuriant where the barrels had not been steamed.

Sweetened condensed milk in barrels sells for from four cents to seven cents per pound, the price varying, primarily, with the percent. of fat the milk contains, and, secondarily, with the demand and supply of this class of goods in any given locality.

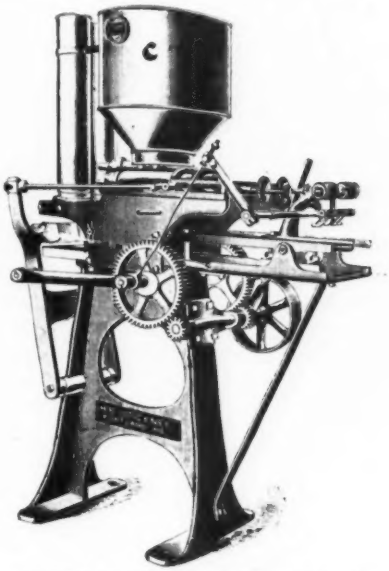


FIGURE IV—The Stickney Filler (kindness of H. R. Stickney, Portland, Me.)

For reasons which will be discussed in the chapter on "Marketing Condensed Milk," the profits derived from the sale of bulk sweetened condensed milk are usually small.

CANNED GOODS. — Sweetened condensed milk intended for the retail market is put up in tins cans holding 8, 12, 14, 15, 16 or 20 ounces. The 14 and 15 oz. cans are those most commonly in use. These cans have a small opening in one end (from $\frac{5}{8}$-inches to $\frac{3}{4}$-inches in diameter) through which they are filled. As the sweetened condensed milk is of semi-

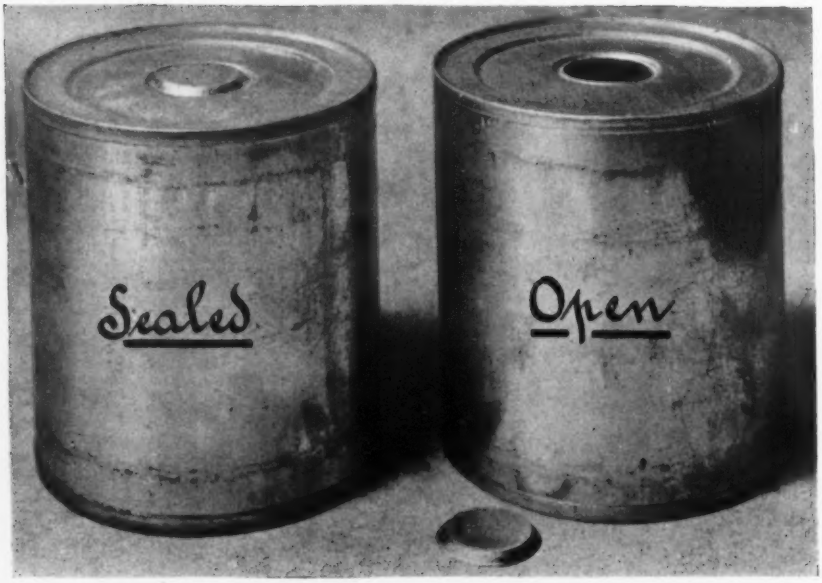


FIGURE V

liquid, viscous consistency, the operation of filling without spilling some of the milk over the top of the can, is somewhat difficult. For this reason many ingenious machines have been devised which are more or less successful in cutting off the milk without slobbering when the can is full. The filling machines now in use vary from the primitive hand filler, in which the condensed milk is "ground out" by a crank turned by hand, to the most modern and most perfect forms of automatic filling machines. Figure 14 illustrates the "Stickney Filler" which is, perhaps, the most satisfactory filler on the market. Its working parts are all constructed of brass and operate with a remarkable degree of precision. The discharge is adjustable to fill any size of condensed milk can. The condensed milk is most conveniently poured through a fine wire mesh strainer into a tank located above the machine and connected with the reservoir of the filler. The reservoir has an automatic feed, a valve and floating ball, which regulate the inflow of milk according to the discharge. This machine will fill from 25,000 to 30,000 cans per day (in ten hours). The filled cans should be "capped" immediately. If they are allowed to stand open, dust, dirt and flies are prone to be blown into them, and the prolonged exposure of the condensed milk to the air will cause its surface to crust over.

The filling machine should be thoroughly washed and cleaned at least once per week and, if possible, at the close of each day's work. In order to do this the filler should be dissected, taking out all the movable parts such as valves, pistons, tubes, etc. When all the remnants of milk have been removed, all the parts should be scalded, then dried and put back into their places. To guard against any possible contamination from the wash-water, it is advisable to reject the first few cans full of milk of the next filling. When not in use the filling machine should be well covered with cheese cloth or oil cloth to protect it from dust and dirt, etc. Strict attention to these precautions while in-

expensive, will lengthen the life of the machine and may prevent the development of disastrous fermentations in the condensed milk later.

SEALING.

The next step is the sealing of the filled cans. In the case of sweetened condensed milk the filled cans are not, subsequently, subjected to the process of sterilization, as is the case with evaporated cream. While the seal must be airtight, it need not be firm enough or strong

FIGURE VI

enough to resist the process of sterilization. For this reason more than one method of sealing can be satisfactorily used with sweetened condnesed milk, while evaporated cream cans must all be heavily sealed with solder.

The kind of seal applied depends on the construction of the can. Most cans used for sweetened condensed milk are sealed with solder, as shown in Figure 5. The tin around the opening of the can is shaped into a groove, a cap fitting into the groove is laid over the opening and the groove is filled with solder. Figures 6, 7 and 8 illustrate different makes of cans which are sealed without the use of solder. In Fig. 6 a tightly fitting cap with a wide flange is pressed into the opening. By passing the "capped" can under a series of steel rollers the flange forms a hermetrical seal with the top of the can. Fig. 7 illustrates

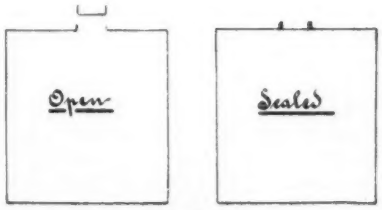


FIGURE VII

a can of the "Gebee" patent. In this can a rim projects around the opening and after the cap is inserted it is crimped over this rim by means of a revolving die, thus forming a very firm and satisfactory seal. In Fig. 8 one end of the can is entirely open. After the can is filled the end is put on and its flange crimped around the periphery of the body of the can.

Each of these different seals has its advantages and disadvantages. The seals without solder lessen the expense of manufacture. Most of the seals without solder are satisfactory. Where the cans are subjected to very rough handling, however, as is especially the case with goods for export trade, it sometimes happens that the caps come off, causing serious annoyance and usually considerable loss, not so much on account of the actual loss of condensed milk, but because of the spoiling of the labels of the remainder of the cans of the entire case of milk containing the leaky can. The type of cans shown in Fig. 6 seems to be most subject to this weakness. The principal reason, however, why the better types of solderless seals are not more generally in use by milk condensing companies, lies in the fact that the individual concerns who invented the machinery for making these seals have patented their inventions. They refuse to sell their patents at reasonable price to other con-

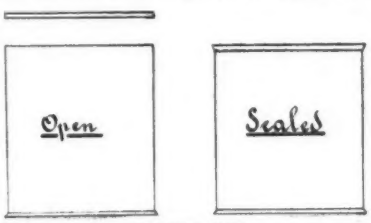


FIGURE VIII

densories, and they charge exhorbitant royalties for the use of their patented machinery by their competitors.

The use of solder necessarily requires the application of some kind of soldering flux to prepare the surface of the tin for the reception of the solder. The common practice of using zinc chloride or some other similar acid flux for this purpose cannot be too strongly condemned. Every one familiar with soldering knows that the flux always preceeds the solder. When the hot solder is applied some of the flux is bound to sweat through between the cap and the can and to gain access to the interior of the can. Acid fluxes such as zinc chloride are of a highly poisonous character. Their presence in the can will jeopardise the health and life of the consumer. There are other fluxes which are absolutely harmless, and, if properly used, give just as satisfactory results. Dry, powdered resin, also resin dissolved in alcohol or in gasoline are of this class. Ammonium chloride, while used in most tin shops, is not as well suited for this purpose.

Comparatively little improvement has been made in the methods and machinery used for sealing the cans with solder. The ordinary soldering stoves in which the soldering coppers are heated with gas are still much in use and the soldering is done in most factories by girls. Machines have been devised with a series of revolving discs. The cans are set on these discs and the solder and soldering copper is applied by hand. Instead of following the groove in the can with the copper, the copper is held stationary and the can revolves. This method usually appeals to the eye of the

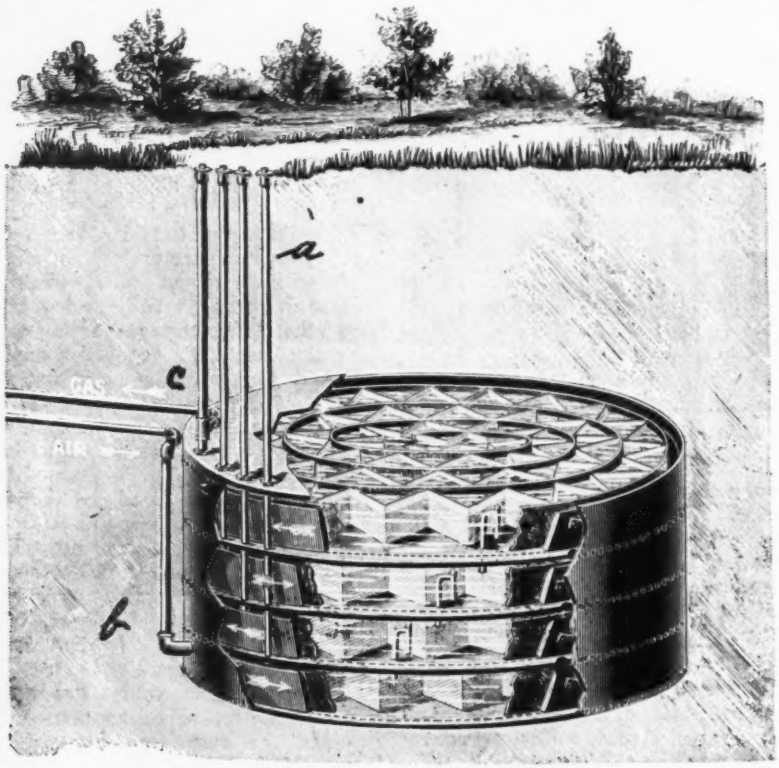


FIGURE X—Improved carburettor of the Matthews Gas Machine.

outsider, but has, in reality, no advantage over the ordinary way of hand sealing. In fact, experience has demonstrated that the soldering can be done faster and just as neatly in the old way. Fig. 9 illustrates a soldering iron in which the copper tip is continuously heated by a current of gas and air running through the handle into the tip where it burns. The handle of the soldering copper is connected with a piece of flexible rubber tubing which in turn is attached to the gas and air pipes. These automatically heated soldering coppers are very practical and satisfactory. No time is lost waiting for the coppers to get hot, and the flame can be regulated so that the tips are subjected to a uniform temperature.

The copper tips used for this purpose should be slender and well drawn out. Blunt tips make good and neat soldering in a narrow groove very difficult. Where the sealing goes on all day the copper tips should be heated in the forge, drawn out on the anvil and filed down to a fine point at least once per day. The foreman of the sealing-room should make it his business to see that all the sealers' tools are in the best condition. He will thus avoid much delay in and improve the quality of the work.

The solder is used either in form of light bars or in form of wire. The wire is usually bought already cut up into small segments, each segment furnishing enough solder to seal one can. The smaller the opening of the can the less solder is necessary to make the seal. The use of an opening smaller than 5/8-inch in diameter, however, would interfere with the ease of filling the cans. The essential points of satisfactory sealing are: No "leakers," neat work, reasonably swift work, and a minimum amount of solder. Aside from the size of the cap the amount of solder used depends much on the experience of the sealer. Beginners usually make an uneven seal and waste much solder. This is partly due to their ignorance of the proper soldering temperature of the coppers. An experienced sealer will use from 2 to 3 pounds of solder per 1,000 tin cans and will seal from 1,500 to 2,500 cans per day. The solder used in the condensories is, as a whole, of poor quality, containing from 45 per cent. to 55 per cent. of lead. Lead is a poisonous metal and its use in the canning industry should, therefore, be reduced to the minimum. In Germany the law requires that the solder used in tin cans for food products should not contain more than 10 per cent. of lead.

Condensories are seldom located in towns large enough to have an artificial gas plant of any consequence. Where no natural gas is available, therefore, the factory must rely on its own generator. As the gas is used mostly for heat, gasoline gas seems to be the most suitable gas for condensory use. Gasoline gas is produced by simply forcing atmospheric air over or through a body of gasoline, so that the air comes in contact with the gasoline vapors. A mixture of air and the gasoline vapors produces the gasoline gas. There are various different makes of gas machines on the market. For condensory purposes the "Matthews Gas Machine" has proved to be very satisfactory. It consists, principally, of a carburettor, an air pump or blower, and a regulator. Fig. 10 shows the interior construction of the carburettor. It consists of a series of 4 cells connected with one another by means of siphon tubes. The interior of each cell is partitioned off with heavy cotton wicking. This wicking has for its purpose to absorb the gasoline by capillary attraction. The air, passing through the fine meshes of wicking, comes in contact with a large surface of gasoline. The gasoline is introduced into the cells through the vertical tubes (a). The air enters in the bottom cell (b) and is forced through all four cells leaving the carburettor as gasoline gas at (c). Where power is available, as is the case in every condensory, the current of air is best generated by a "blower" (a centrifugal fan). The following are some of the essential points to be con-

sidered when installing and operating gas generators:

Locate the gasoline store house and carburettor at some distance from the factory to avoid unnecessary danger from fire. Sink the carburettor low enough into the ground (3, 4 or 5 feet below the surface if necessary) to allow the gas pipe to slant from the factory to the carburettor. If the gas pipe is horizontal or is inclined toward the factory the condensation water in the pipe will collect and obstruct the free passage of the gas. In this case there will be either no gas available in the factory or it will come in gusts which is equally unsatisfactory. On the other hand, where the gas pipe slants down towards the carburettor, the condensation water can run back into the cells and will cause no interference. Use gasoline of the best quality only. It should test at least 88 degrees Beaume. Buy the gasoline in iron barrels, as it vaporizes rapidly in wooden ones, causing loss, especially during the hot summer months. Fill the cells not more than two-thirds full. An excess of gasoline over that will reduce the gas generating capacity of the carburettor. If, on extremely cold winter days the carburettor refuses to gentrate gas, introduce a pint of wood alcohol through the blow-pipe into the cells. This will usually remedy the trouble. When properly installed and intelligently operated these gas machines give good satisfaction. Due attention to the above points will prevent much annoyance, delay and extra labor in the sealing-room.

(To be continued.)

BACK TO THE LAND

By M. W. Evans, '06

IN the October number of the *Countryman* Mrs. Comstock pointed out that the American farm has been an important factor in the development of our nation. In the same article she called attention to social and economical forces, which, if allowed to go unchecked, may tend to divide the population of our farm communities, and of the nation into aristocratic and plebian classes. However, there are also arising other counteracting forces, which, if given an opportunity for a full development, will maintain the old-time healthy condition of our rural communities.

From a country place, fifty or sixty miles from Ithaca, remote from any large town or from any railway, during the last half century a large number of farm boys have left the district school to enter higher institutions of learning in order to acquire—usually by their own efforts—a better education. These boys became ministers, doctors, lawyers, educators, and statesmen. Gratifying their desire to improve their condition meant to them to leave the farm and to ally their interest with some other calling than agriculture.

Within the past five or six years, however, a change has been taking place in this community. A number of the boys who have entered college have taken agricultural courses, and some of the boys now in the district school and township high school are also planning to take a longer or shorter course of study in agriculture. What is the reason for this change? Farming is being raised to a science and a profession that is worthy of the highest ability and best ambitions of any person who can choose life work. The average farm boy does not really dislike agriculture. When he begins to hope and dream of the day when he can leave the farm, it is only because its opportunities look small to him compared with those of some other calling. Convince these boys that no other field offers a better future than does agriculture, and the stream of young men who for the past century have been going to the cities and draining the country of its best material will be checked. Place enough of these young men, who have broadly-trained minds and are skilled in the arts of agriculture, on the farms of this country, and it will be unlikely that much of the land will pass into the hands of capitalists.

IMPROVING THE FARM HOME

By V. R. French, '07

LAST year several Cornell students conducted weekly reading courses among the people of Varna and the surrounding country. The reading clubs were in connection with the extension work carried on by the students of the College of Agriculture. When the meetings came to a close last spring, it seemed doubtful if their influence would result in any actual change in the home surroundings or manner of living. Their object had been to create higher ideals of life and better methods of farming. The people had evidently received new ideas, interesting thoughts and valuable suggestions for the better management of their land, but there was certainly a need of something else to make them actually work toward higher conditions.

To accomplish this, two prizes were offered, amounting to twenty-five dollars, for the two homes which would show the most improvement by the following autumn. The places were not to be judged by their comparative beauty but solely by the amount of effort and improvement made on them. The plan was favorably regarded by the farmers and fifteen contestants were secured through personal visits. Bulletins on landscape architecture, garden making and home planting were carried to them. Thanks to Dean Bailey, Mr. Baker, a well-known artist and Cornell graduate, personally visited each farm last spring, making suggestions for improvement and taking photographs of the most unsightly portions of their yards.

On Oct. 8 the judges, Mr. Baker, Mr. McCaughey and Miss Kleniewska revisited each home. Especial attention was given to the general appearance of the yard, neatness of detail, condition of lawns and fences, and the character and apparent motives of the changes made. In every case effort had been spent toward improvement and most of our suggestions had been effective, but they had striven for something and that in itself was the accomplishment of our purpose. One place in particular showed an immense amount of work toward improvement. The house was painted, the lawn had been graded and completely made over, clear-cut edgings traced the road, a curved cement walk lead to the front door, useless bushes had been cleared away, all broken machinery was gone, flower-beds banked the house and a rustic seat in the shade of a lilac bush suggested leisure.

On the whole the movement was successful. Its promoters hope to continue its influence until permanent results are evident to the casual observer.

AN APPLE CROP IN WESTERN NEW YORK

By M. C. Burritt, '08

THE time has come when the loose and inefficient methods of the apple grower in Western New York have been compelled to give way before the better organized and better equipped methods of the present. The change has been forced by the greatly increased production of apples in that section and by a scarcity of efficient labor.

Before apple growing became as much of a specialty as now, the harvesting of other crops at the same time greatly interfered, so that the work was hurriedly done, occasioning considerable waste. Apples were generally placed in piles upon the ground, where they wasted, or were at least injured, and required more time to pack. Fruit was seldom graded or properly packed, much of it going to market in bulk.

At the present time, at least among larger and better orchardists, apples are handled with greater rapidity and less loss. In the first place they are picked and placed on sorting tables by men working in gangs, so that those packing are kept busy. The number of packers depends on the number of pickers. These latter men are mostly hired "from the road," as the apple

picking season in Western New York draws large numbers of these "transients" from all over the country. They are attracted by reports of the scarcity of help, and of high wages paid. They receive $1.50 to $2.00 per day and board, or 8 to 12c per barrel.

The fruit is usually sorted upon tables in the orchard, just as it comes from the trees. The table, usually about 10x3 ft., is sometimes padded to prevent bruising. It is slightly inclined and the packer stands at the lower end, where he grades the fruit as "No. 1's," "No. 2's," and sometimes "Fancys."

The popular package is the barrel. It is usually immedately loaded in refrigerator cars and rushed to cold storage. Heretofore, considerable loss has been occasioned by allowing barreled fruit to remain in the warm air for some time before shipping.

Up to within a short time, practically all of our fruit had been sold in almost any package and at any price. Since growers have learned that it pays to grade and pack fruit, much more has been sold in standard graded packages.

HANDLING SECKEL PEARS

By W. W. Bassett, Sp.

They should be graded according to the crop you have to handle. As an illustration, part of the crop that the writer had charge of handling last year was exceedingly fine, so a grade of Extra Fancy was made, following down with Fancy, Number One, Number Two and Culls. Number Two fruit was not stenciled "Number Two," but just plain "Seckels." This year the same crop was not so good in quality and the Extra Fancy grade was left out, the predominating grade being *Number One.*

Now to go back to the seckels as they are brought into the packing-house. They are poured on a slatted sorting-table where the actual grading is done. A sorter stands at either side of this table to first pick out the finest and best colored pears as facers for the different grades being put up; then all the culls that do not fall between the slats should be picked off and thrown into crates. The predominating grade now on the table is run off into a faced keg, the other grades being picked out as they pass the mouth of the table and placed in their respective grade. This is generally done by the one in charge of the packing.

The fourth man faces the kegs; he first places a wax cap paper in the bottom of the keg, then one circle after another of pears is placed with the high-colored side of each pear next to the paper and the stems all pointing toward the center of the head. Two tiers are thus put, after which the keg is ready to be filled from the table.

The fifth man nails one head and both hoops and loosens the other head in readiness for the facer. It is also his business to replace, nail, and stencil the head when the kegs are filled.

Five men in this way will put up one hundred or more kegs per day, according to the quality of the fruit.

The kegs are next drawn and loaded in the car, 400 making a car load, and sent to the cold storage house where they are kept until the market is in shape, when your commission firm sells them at a figure above the market price if he knows your package and can guarantee the packing. Such a grade as Extra Fancy handled in this way last year sold for $3.00 per keg; Fancy, $2.50; Number One, $2.00; Number Two, $1.75. Just as good fruit handled in the ordinary way, large and small fruit mixed together, sold for $1.75 per keg, thus showing the advantage of grading carefully and honestly. This cannot be emphasized too strongly. The packing and selling of fruit is generally the weakest point with the amateur fruit grower.

NATURE STUDY UNDER DIFFICULTIES

By F. M. Snowdon, Sp.

After having taken a little Nature Study, and feeling very wise along that line, according to my own ideas, it came in my way to get a couple of friends, who were teachers in the public schools, interested in it. They were very promising material, or it would not have been an easy matter, as it proved to be. As these girls were more interested in ants than they were in bees or toads we decided to make ants' nests. The making of the nests was an easy matter, being accomplished in one afternoon, but our difficulty came when we tried to get the ants. One afternoon we started out with our outfit, which consisted of a couple of large-necked bottles and a trowel. Going along we turned over several stones without finding any "ant signs." When we did find signs we had difficulty in digging the ants up, because the ground had baked so hard that it was almost impossible to dig down for more than a very few inches. We had some luck, however, and, on turning over a log, a colony of large black ants was found. A large number of these were taken, a queen among them, but very unfortunately no larvae. Not being satisfied with a colony without any larvae, also as we had found a man who was very much interested in Nature Study and was willing to dig for the ants, we succeeded in getting part of a colony of red ants. This lot of ants had larvae, but no queen, so the two colonies were of about the same value. One of the girls decided that she wanted to go out to dig ants for herself, so both colonies fell to the share of the other girl. First, she put the black ants in the nest, but one day when she had the nest open and was looking at the ants, the queen, taking advantage of her chance, escaped. Then, since she still had the red ants, the girl took the black ants out of the nest and put the red ones in. These were getting along very nicely when last heard from, only a few of them having escaped. The girl, however, was having great difficulty in convincing her mother that the ants were harmless. If the ants are still in existence they are in one of the lower grades of a large grammar school in a large city, and are probably all of the Nature Study that there is in the schools of that city.

The Cornell Countryman

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NOVEMBER, 1906

Making Good

To "make good" is to be successful. It is more than that. It is to be successful to the limit of your capacity and to the limit of the capacity to which you are able to develop yourself. Making good is to so make use of every chance that it is worked to the limit, to make use of each and every day so that you have done with it the most that was possible.

The "Man with the Hoe," as Millet and Markham portrayed him, was not a failure. He lived and died on the same spot that his forefathers did. His thoughts never lifted above his daily work beyond which he made no progress. Yet, he made good. He did the work given him to do and did it well, did it to the utmost of his powers and opportunities.

You, who have been or are Agricultural students, may become roaring successes. You may be rich and famous, preeminent among your neighbors and a power in the State. The boy who, struggling with a large mortgage and a small ability, is trying to run the next farm may be making good, you may not be, even with your great success.

Unless you work to your limit in quality and quantity you are not making good. To us, as students of a great university, the world rightly looks for more than from the man who has not had our chance. We must do more and better work than he. Because we have a larger place we must not only fill it but fill it better than he in his smaller one. We must do to the limit what we are able to do. Fame does not come to everyone, but to everyone comes the chance to make good.

So live that it all can be summed up in an epitaph:—"This man made good."

The Assembly

Our College has so many students that it would be impossible at any one time for a member of the faculty to entertain the entire student body at his home. The faculty have, however, desired to extend hospitality to the students and the monthly Agricultural Assembly is held for that purpose. The ladies of the faculty entertain in turn and frequently ask several students to assist them. The Assembly is a faculty affair held for the students. It is not one of the student activities and is not held by or through the Agricultural Association. We attend the Assembly at the invitation of the faculty. Therefore, it is merely good manners that we should so conduct ourselves in dress and demeanor that we will show we appreciate that we are at the Assembly as guests.

A New Department

With this issue a new department is started or, more properly speaking, an old department is re-

vived. The opinion has sometimes been expressed that *The Cornell Countryman* was not fulfilling one of its missions; that students in the college did not find in its columns a place for the papers and articles which they might care to write; that although articles by students have always been acceptable to the editors, the students did not usually care to write articles which would be compared and contrasted with those written by the eminent men and women who contribute to *the Countryman*.

In order to avoid this comparison, and that more material by students may find its way into the columns of the paper, there will be maintained, as long as the students will sustain it, a department for their articles, which will be printed following the main articles and before the editorials and news items. Those submitted for this department should not exceed four hundred words in length. All students are urged to contribute and so make that part of the paper a success. Every student can write something of interest to our readers; a description of some farm operation, some new farm machine, some unusual experience, or, perhaps, some suggestion for the College. One of these could be contributed by everyone, from the youngest freshman up the oldest graduate student. It is not expected that articles will ever be solicited for that department, so do not wait to be personally invited to contribute. Send in something to the paper. It is not hoped that each article shall be a model of its kind or that it shall add greatly to the sum of the world's knowledge. Anything of even small interest will be sufficient to warrant its having been written.

The Manufacture of Condensed Milk

In this issue we renew the series by Prof. O. F. Hunziker on "The Manufacture of Condensed Milk," which has been discontinued during several months. We again desire to call the attention of our readers to these articles which are of most unusual interest. The manufacture of condensed milk has, until this time, been largely a secret process. *The Cornell Countryman* is publishing what is practically the first literature on the subject.

GENERAL AGRICULTURAL NEWS

The Ontario County Fruit Growers made a step in the right direction in the organization of a co-operative society. A preliminary meeting was called at Canandaigua about the middle of September to consider the feasibility of getting the fruit-growers together into a society. The meeting was addressed by Prof. Craig, Mr. C. S. Wilson, instructor in Horticulture at Cornell, Prof. Bailey and Dr. Jordan. Mr. Thos. B. Wilson, president of the State Fruit Growers Association, urged the necessity for a co-operation among the fruit growers of the state and told of the benefits which were even now accruing to the members of the state organization.

A society was formed of forty prominent horticulturists of the county with Mr. C. S. Wilson as president and Mr. John A. Page, Phelps as secretary. The growers hope to increase the demand for Ontario apples, to assist each other in the transportation problems, to produce a better quality of fruit and to market it in a thoroughly businesslike and up-to-date manner.

Such organizations have proven of incalculable benefit wherever they have been tried but most notably in the Hood River section of Oregon and the peach region of Michigan.

* * *

The February ruling of the official railroad classification committee that corn, seed in the ear would not be accepted for transportation in crates, is causing consternation among the shippers of seed corn and much adverse criticism by the agricultural press. The committee defended its action on the ground that the crates were flimsy affairs which permitted the pilfering and the shelling of the corn from the ear. The growers claim that the crates used are strong and safe and that no trouble has ever been experienced from shelling and pilfering. It is practically impossible to ship seed corn in tight boxes or bags and have it keep good. Experts estimate that tight packing will impair the vitality of the seed fifty per cent. Again, seed corn should always be shipped in the ear as the buyer and planter cannot get an intelligent idea of what the ear unit is like unless he sees the ear.

* * *

New York City now boasts a county fair. Last year an Agricultural Fair Association was organized and this year a most successful and enjoyable county fair was held within the limits of New York City from September 3 to September 8. The county of Richmond, where the fair was held consists of Staten Island and contains less than 300 farms which will scarcely average 40 acres apiece. The population is almost entirely interested in business and manufacturing pursuits. Its agricultural population is chiefly occupied in market gardening and fruit growing, while the minor dairying interests are of some importance. The flower and fruit exhibits were especially good and the poultry and pet stock exhibits unusually extensive.

* * *

The dairying exhibit of the Cornell Agricultural College at the State fair attracted considerable attention. The electrically driven Babcock milk tester was one of the features of the exhibit. The College also exhibited plates showing the bacterial contents of milk under varying conditions of cleanliness. This included samples of milk from the old and the new styles of milk pails and the showing of 1,300 bacteria per centimeter of milk for the wide mouth pail as against 300 for the small mouth clearly demonstrated the sanitary excellence of the latter.

* * *

Prof. L. H. Bailey, Jas. W. Wadsworth, Jr., Lieut. Gov. Bruce, State Master George A. Fuller, and Past Master E. B. Norris were speakers on Grange Day. Prof. Bailey advanced the idea that the State Fair should provide a building devoted to the educational side of the farm where the State Agricultural College and the State Experiment Station could have exhibits. Grange Day has now become a fixture at the State Fair and the attendance of the Patrons was particularly large this year.

* * *

The New York Zoological Society has been notified that its offer to place a herd of Buffalo on the Wichita Forest Reserve has been accepted and it will ship in a herd of from fifteen to twenty buffaloes as soon as an area of good grazing ground can be fenced in. The New York Society sent J. Loring Alden to Oklahoma to select the grazing grounds and an appropriation of $15,000 was inserted in the Agricultural bill to build the fence.

Congress has also passed another important bill relating to the preservation of the Buffalo during the past year. This bill authorized the rental of 3,500 acres of land for a buffalo pasture in Stanley Co., South Dakota.

* * *

During the past summer an eradication test for the contagious disease known as "Little Peach" has been started in Niagara County. The work is being carried on by Prof. M. B.

Waite of the Department of Plant Industry, Washington, D. C., in cooperation with the Cornell Experiment Station.

The "little peach" is like the dreaded yellows in some respects, but while the yellows has been known for a hundred years and is pretty well established in the peach growing areas of the Central and Atlantic States, the "little peach" occurs only in Niagara County and in one small area in the Michigan peach belt. The first reported cases were subsequent to 1890. Scientists are still in ignorance as to the cause of both "little peach" and yellows, but its contagious character has been demonstrated beyond a doubt.

The object of the eradication test is to determine the efficiency of prompt eradication methods in controlling the disease. An area of about twenty-four square miles was chosen between Lewiston and Fort Niagara and between the Niagara River and the Creek Road. This area was thoroughly inspected, every tree being carefully scrutinized even stray trees in gardens as well as large orchards. Each tree found diseased was marked for destruction. Thirteen hundred and fifty trees were marked for little peach and four hundred and seventy-four were marked for yellows.

It is surprising that the little peach should outnumber the yellows to so great a degree. However, the yellows is easily recognized in the first stages by any farmer by the premature and abnormally colored fruit and prompt eradication has been practiced quite generally in this area for years. The first symptoms of little peach on the other hand are not easily detected by the ordinary farmer and he usually leaves the trees till the second year or until the symptoms become aggravated to an extent sufficient for him to recognize them.

Herein, then, lies the value of inspection by experts trained to recognize the fine points of peach diseases. All of the affected trees are marked in the first stage of the disease and the farmer is enabled to destroy them before the disease spreads to healthy trees.

J. Eliot Coit of the Horticultural department at Cornell and L. F. Paull with William Hall of Youngstown have been assisting Prof. Waite in the first inspection . The farmers of this area are enthusiastic. They have shown their good will and courtesy to the inspectors on every occasion. This work will be continued in 1907 and it is hoped that if all marked trees are promptly eradicated that the disease will be either stamped out, or reduced to such an extent that only an occasional tree will be lost each year.

CAMPUS NOTES

The College of Agriculture announces an endowment of five scholarships, by Mr. C. H. Roberts, M. D. of Ulster Co.,N. Y. Mr. Roberts has given to the University for use by the College of Agriculture, six hundred shares of the Reading Company's First Preferred Stock par value fifty dollars each. The proceeds are to be used for five equal scholarships to be known as the Charles H. Roberts Scholarships Nos. 1, 2, 3, 4 and 5. They are to be awarded by the faculty of the College of Agriculture under such rules as the faculty of the College shall determine. They are to be open to all races of mankind, regardless of political or religious creeds, of good moral character and of required qualifications; preference to be given to intelligence and financial inability. If used for any other purpose, the principal shall revert to the legal heirs.

Mr. C. H. Roberts is a graduate of the Albany Medical College, has been a practicing dentist at Oakes, Ulster Co., N. Y., and has always been interested in country boys and in country life and education. This endowment is, as far as we know, the first one of its kind for scholarships in agricultural education, and Mr. Rob-

erts thus becomes a large benefactor in opening up a new and much needed beneficence. Scholarships in agriculture are needed, perhaps, as much as in any other line and it indeed seems strange, that it should have been left until this time for the start to be made. The good which will be done by these scholarships, and by the others which will doubtless follow, will be inestimable.

* * *

The first class in the new buildings of the College of Agriculture was held Oct. 10. The exercises included several speeches from members of the N. Y. State Society for the Promotion of Agricultural Education and Research. Dean Bailey made the opening address and said in part:

"Eighteen years ago I became connected with this institution. I was assured we were to have a new building the next year. The next year came and it was decided in the University councils that a chemistry building was needed most, so Morse Hall was the result. The State had been paying less interest on the University funds than it had promised and suit was brought to recover the balance. Then we were to have a building sure-

Exhibit of the New York State College of Agriculture at the Tompkins County Fair, Sept. 1906

ly. Attorneys have their ways, and a long time ensued. When the money was finally recovered, the Law College had a greater influence and apparently a greater need, so Boardman Hall was built. So it has gone through the years. I am glad it has turned out so. A thirty thousand dollar building would be all right for a new barn or equipping a poultry plant, but not for a College of Agriculture. If we had been given a building, we would be surrounded and cramped in by the other buildings on the Campus. Now we are right next to the farm, out in the edge of the country, as it should be. We now have a building with a floor space of more than three acres, and the best buildings in the United States, if not in the world, for a College of Agriculture."

Other speakers followed, among them being Mr. Olin, President of the N. Y. Association for Advancement of Agricultural Education and Research; Mr. T. B. Wilson of Hall's Corners, Secretary of the above society; Mr. F. D. Ward, the noted cattle and stock judge of Batavia, and Dr. C. H. Smeed, President of the State Shropshire Breeders' Association, and Prof. Pearson. After the exercises the new buildings were inspected by the visitors and faculty.

* * *

The 51st annual meeting of the State Association of School Commissioners and Superintendents was held here at the University on Oct. 3-4-5, and was marked by the enthusiasm of its members, the warmth of the discussions, and the importance of the sessions. Much of the commissioners' time was occupied in a discussion concerning the best means of adapting the rural schools to their environment, and of enabling them to fit men and women to live in the country and to appreciate the surroundings amid which they are to make their homes. The discussions centered largely around agricultural and nature study as means toward this end, as the ideas expressed by Professor Bailey and others show. This is not, in any sense, to transform the elementary schools of the state into technical institutions, nor even to add anything to their curriculim, but rather to so adapt the studies of the farm boys and girls that they will be concerned with the country, and its life and work. It is to teach arithmetic as a means of calculating the farm produce and its worth, not as road towards a hazy goal of cube-root and algebra; to teach geography as a part of the locality, of the soil, the trees, the rocks, the hills, and after that of the country and the state; in short that all this knowledge which we are striving to acquire, should come naturally and not artificially and, in order that it should come naturally, it must come through the medium of the student's environment, through the farm, its ways, and workings.

Agriculture and Nature Study are already offered as separate elective studies, but the concensus of opinion at the meeting, as expressed by Professor Bailey, was that the school should not teach agriculture separately, but as a part of the general scheme of pedagogy, of which it should be a basic factor. Finally, it is thought that a rural school, or in fact any school, should be largely a laboratory —a place for the study of things, and not of facts!

Much attention was drawn to this laboratory principle, by the new model schoolhouse which is being built on the Campus by the College of Agriculture. This school house, which is a combination of laboratory and classroom, consists of two rooms, one where the study of books will be conducted and one where there will be the study of things. It is, as described in the October *Countryman*, such a building as any country district could build for $1,800 or less, since labor is cheaper in many small communities, than in Ithaca. It was expected that the building would be completed and in use at the time of the meeting, but this expectation was not realized. When finished, it will be conducted as a model day-school for the Campus children, and also for observation and experimentation. As has been said, the difference between this and other small schools, and a difference which is felt to be a fundamental one, is that it has a *laboratory*. Since laboratory work was instituted in the colleges, it has revolutionized the system of teaching. Likewise it has broadened the work in the secondary schools, and now, it is felt that it will effect the same good and the same improvements in the elementary schools of the state.

* * *

Charles H. Tuck, A. B. '06, who specialized in Agricultural work in his senior year, has been appointed Supervisor of the Farmers' Reading

Courses conducted by the College of Agriculture. Mr. Tuck fills a vacancy left by the absence of G. W. Hosford, B. S. A. '02, M. S. A. '05, who this year is conducting Horticultural investigation for the Department of Agriculture at Washington.

* * *

The first meeting of the Agricultural Association was held in the West Dome of Barnes Hall on Oct. 9. Though the attendance was but about fifty, there was plenty of enthusiasm and an interesting program. W. H. Alderman, President of the Association, opened the meeting with a brief review of the work last year. After the business had been transacted, Dean Bailey was introduced and gave an interesting and enthusiastic talk upon the Country Schools movement and the part that agricultural graduates could take in it. Following Dean Bailey E. W. Cleeves, '07, gave an account of his summer's experience on the farm of the George Junior Republic in Connecticut, where he held the position of Farm Superintendent. G. D. Cooper, '07, then recounted his adventures and trials while doing landscape architectural work in Cleveland during the summer. J. B. Shepard, '07, followed with a description of his summer work, which consisted in compiling a farm and soil survey of a section of Tompkins County. In his review he described and compared several farms and their soils, giving an idea of the conditions in the section. Dean Bailey gave a further review of the Associations' history and a forecast of its possible future. To one who heard Dean Bailey, it would be unnecessary to commend the Association and its work. It is hoped that everyone, including those who were not at the first meeting, will forward its activities by their co-operation.

The first Agricultural Assembly was held in Barnes Hall on the evening of October 4, after a meeting of the State School Commissioners. Though the weather was extremely unpleasant, a large crowd turned out and enjoyed the evening's program. The refreshments were served afterward by Mesdames Bailey, Stone, Wing and Rice.

* * *

The class in Nursery and Orchard Practice, numbering about 75 students, went to Geneva, Oct 13, to visit the nurseries and packing-houses of W. and T. Smith Co., and also the New York State Experiment Station. Messers C. S. Wilson and J. E. Coit conducted the class.

* * *

The class in Systematic Pomology went to Rochester, Oct. 13, to visit the home grounds of Ellwanger and Barry. The purpose was to make a study of grapes and pears. This firm has the largest collection of pears to be found in the state.

* * *

The class in sub-tropical Pomology was inaugurated by Dr. J. Gifford, a former professor in the New York State College of Forestry. About 20 students registered at the opening of the class.

* * *

The horticultural department is hoping to close up the survey of the apple and peach sections of Niagara county this season. Work commenced last year and was continued again this summer under the direction of Mr. J. E. Coit and general supervision of Prof. John Craig. The Bureau of Soils has co-operated in this work by making a thorough soil survey of that region, under the direction of Prof. E. G. Fippin and Mr. Mann.

* * *

Among the interesting points in this year's registration is the addition of the names of two new students from India. These are Mr. Datta and Mr. Mitra, both of Calcutta and graduates of the Calcutta Agricultural College. They have entered as graduate students and as such will take up advanced work in the various courses. So far, they have not decided upon any special line of work, but intend to

familiarize themselves generally with American methods.

The arrival of Messrs. Datta and Mitra bring the number of Indian students in the Agricultural college up to seven. P. S. Shilotri, who was last year a regular Freshman, is now in the College of Arts and Sciences where he intends to take two years work. He will then return to Agriculture and resume his work in purely agricultural subjects.

* * *

The department of Agricultural Botany, under the direction of Assistant-Professor H. H. Whetzel, has had exhibits in three fairs in New York State within the last month. These exhibits, which were virtually alike at each fair, were largely of an instructive nature, illustrating the more common Plant diseases. They consisted of specimens of diseased plants, leaves, fruits, etc. from the Botany department's collection, and large charts showing the life history of many diseases, together with various means of preventing and combating them.

The first exhibit was at the Syracuse State Fair and was mentioned in the October *Countryman*. The second, a week later, was at the Oneonta County Fair and the third, the following week, at the Tompkins County Fair. At each of these Mr. Whetzel or an assistant was at hand to explain and supplement the charts. It is gratifying to learn that the farmers of the State evinced much interest in the exhibits, thus showing that the Agricultural communities appreciate and make the most of the increasing scientific assistance.

* * *

Owing to the increase in numbers of many of the classes, numerous changes are noticeable in different phases of the College. In Soils 1, Horticulture 21, and other courses, it has been necessary to increase the number of laboratory sections to accommodate the students. The members of the class in Nursery and Orchard Practice have become so numerous as to warrant a greenhouse to themselves. As a result, the house formerly used for melons, cucumbers, etc., has been assigned exclusively to the class, which is to have full charge of its maintenance and use during the year.

The First Class in the New Dairy Building, October 10, 1906.

* * *

Assistant Professor Whetzel, of the Botanical Department, has in preparation three bulletins dealing with plant diseases. They are Fire Blight on

Pears and Apples, The Alternaria Blight of Ginseng, the Septorial Leaf Blight of Tomatoes, and will appear in published form in a short time.

* * *

On Oct. 5 the registration in the College of Agriculture showed a total of 245 students—a gain of 22 over last year; that is a gain of 9 per cent. over last year's numbers. Though this increase is not phenomenal, or immense, yet it is an increase and goes, with many other facts to show that our College is still growing and keeping pace with the University, and its other surroundings.

Though the figures of the above date are not final, they offer an interesting comparison with those of last years registration. Further additions to the numbers, and another comparison will probably appear in a future number of the *Countryman*.

Students	1905-6	1906-7
Regular, old	62	73
Regular, new	59	54
Special	102	118

* * *

Prof. G. W. Cavanaugh addressed the Pomona Grange, of Genesee County, at Pavilion Center, at 11 a. m., Thursday, Oct. 11th, concerning some phases of soil fertility. The Pomona Grange of Genesee County is the largest Pomona Grange in the world.

* * *

During the absence of Prof. E. O. Fippin, who has been sick with typhoid fever at the city hospital, Prof. T. L. Lyon will deliver the lectures to the students in the various courses in soils. Mr. W. Evans and J. B. Shepard are assisting with the laboratory work in elementary soils and Mr. Chakravarty with the laboratory work in advanced soils.

* * *

The State society for the Promotion of Agricultural Education and Research held a meeting in Prof Bailey's office Tuesday, Oct. 9. This society is composed of about a dozen delegates from such important State societies as the State Fruit Growers' Association, the State Grange and other organizations to discuss various policies and appropriations. This society is virtually a Board of Visitors of the College of Agriculture.

* * *

W. H. Beal, chief of the editorial division of the U. S. Experiment Station, was in Ithaca Oct. 9, inspecting the various departments of the Experiment Station.

* * *

Prof. Clark, formerly of the Utah Agricultural College and Experiment Station, is among the recent visitors to the Agricultural College. Prof. Clark is now going to Montana to the Agricultural College of that state.

FORMER STUDENTS

'04, B. S. A.—G. Arthur Bell is an assistant in the Division of Animal Industry Department of Agriculture, at Washington, and has had marked success in his chosen work. Mr. Bell entered with the class of '03, but sick-

G. A. BELL

ness compelled him to withdraw from school for a year, after which he re-entered and graduated with the class of '04. Living on a stock farm just outside of Rome, N. Y., all his life, stock judging came natural to him. He has judged cattle, poultry and swine at many of the large eastern fairs, and is one of the judges on the expert list. Since being at Washington, he has written two bulletins which have been in good demand among stock and poultry raisers. Mr. Bell has not abandoned his athletics but has continued in them. He rows on the eight of a large athletic club.

'90 Sp.—Miles H. Cookingham is practising intensive farming at Poughkeepsie, N. Y. He has several greenhouses in which he raises violets and sweet peas. He, too, experiences difficulty in obtaining reliable help.

'93 Sp.—Edwin C. Powell has been in Springfield, Mass., for the past six years. For four years he was Associate Editor of "The American Agriculturist Weekly." During the past two years he has been editor of "Farm and Home."

'94, W.—H. R. Talmage now lives at Baiting Hollow, Long Island. He is Vice-President and a director of the "Long Island Cauliflower Assn.," which disposes of the annual cauliflower crop of Long Island. Besides being a farmer, he is manager of a telephone company at that place.

'97, B. S. A.—H. W. Jeffers, after specializing in dairying entered the employment of the Walker-Gordon Laboratory Co., of New York and Philadelphia. He has been so successful, that he now has a part interest in the firms.

'97, Sp.—Paul C. Lindley is now Vice-President of the J. Van Lindley Nursery Co., of Pomona, N. C., and has charge of all the outside work.

'97, W and '00 D.—O. B. Deal has sent in an application for the coming winter course in general agriculture. Mr. Deal has been foreman in a factory until recently, and is now ready to go farming. He wishes to brush up on his knowledge of Agriculture.

'98, B. S. A.—Mr. E. R. Sweetland was in Ithaca for several weeks coaching the football team. Mr. Sweetland is in charge of all the athletics at Ohio State University, Columbus, O.

'99, W., '00 D.—Emory Osterhout is engaged with his father in running a first class stock farm at Cobbleskill, N. Y.

'01, B. S. A., '05, M. S. A.—Ralph W. Curtis is now Assistant Superintendent of the Boston Park System, with headquarters at Pine Bank, Olmsted Park, Boston, Mass.

'02, Sp.—C. C. Cole, of Romulus, N. Y., has recently for two months been on a farm in Ohio giving the foreman a few pointers on up-to-date stock breeding and dairy farming.

'03, B. S. A.—Arthur W. Cowell is one of the successful landscape architects of Pittsburg, Pa., and has successfully carried through several important landscape gardening plans.

'03, W.—Shuler M. Jones was in Dakota this past year, looking over the land, preparatory to locating there, but returned decided that good old New York offered better propositions than the Dakotas. He is now farming at Adams, N. Y.

'03, D.—B. J. Young is working for the Sheffield Farms Co., at Hobart, N. Y. They receive over 450 cans of milk and cream daily.

'04-'05, Sp.—K. C. Moore has returned to Georgia, where he is now in charge of the large farm of W. B. Roddenburg, of Cairo.

'04-'06 Sp.—Frank G. Thayer is in charge of the poultry experiment farm at Crookstan, Minn.

'04-'06 Sp.—Henry Jennings, after specializing in poultry for three years, is in Maryland at College Park as Poultryman of the Experiment Station.

'06, W. P.—Louis Boyle was the representative of the Cornell Incubator Co. at the State Fair, Syracuse. He was in charge of the incubating and brooding at the E. G. Wyckoff farm during the past season and has entered as regular this year.

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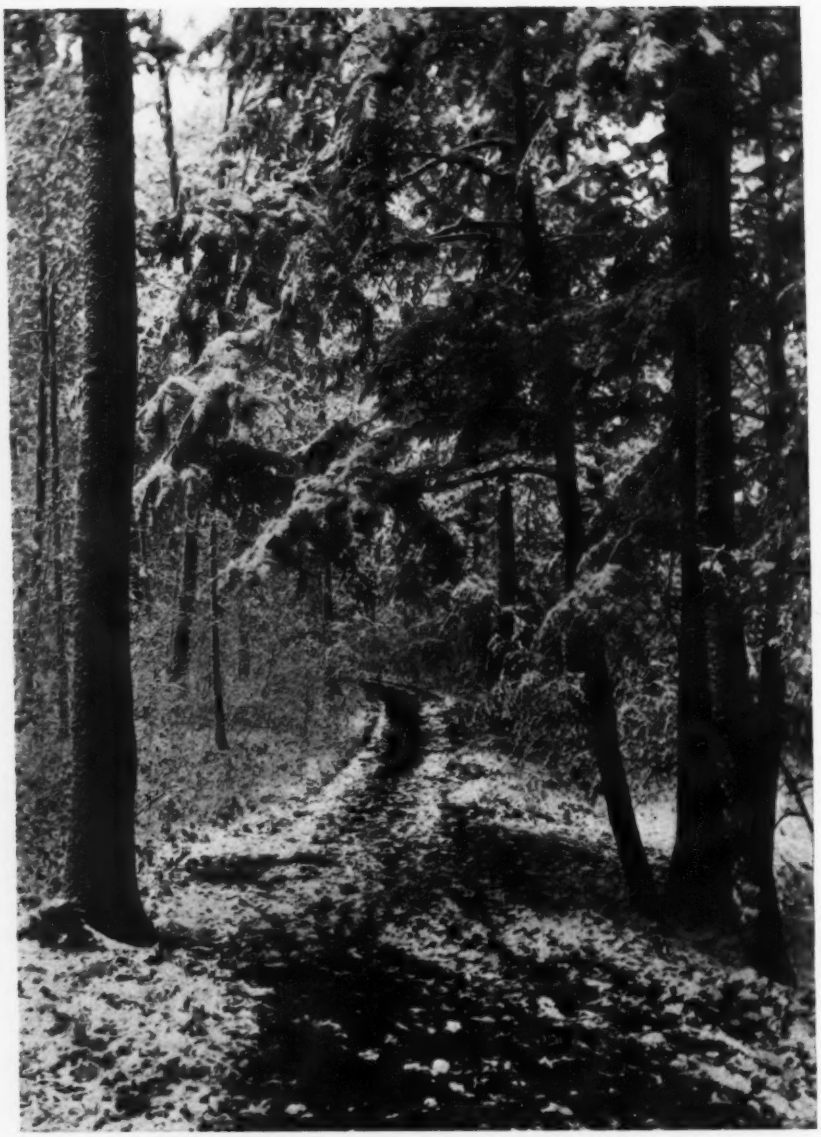

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LET FALL SOFT BEAUTY, TILL EACH GREEN BRANCH IS PLUMED AND TASSELED"
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